

knowledge of climate, stars, plants, and nature generally possessed by the old-fashioned shepherd, who, as I have mentioned on a previous occasion, was, despite his frequent inability to write or read, thoroughly and completely educated and equipped for the purposes of his calling.

Much has been made in works on the Bible and in sermons, of the fact that Syrian shepherds lead, instead of driving, their flocks; but, as the author points out, and as everyone who has lived in the country ought to be aware, this is by no means a peculiarity of Eastern lands. Very interesting are the notes on sheep-bells, which are stated to date from a remote antiquity, and it is therefore the more remarkable to find that they are apparently unknown in the Isle of Man and Scotland. With this I must take leave of a delightful book. R. L.

#### DR. ALEXANDER BRUCE.

NEUROLOGY and medicine have sustained a heavy loss in the death of Dr. Alexander Bruce, of Edinburgh, physician and editor of *The Review of Neurology and Psychiatry*. It was known for some time that Dr. Bruce was in ill-health. The news of his death, however, came as a shock to many.

Born in Aberdeenshire in 1854, Dr. Bruce entered the arts faculty of Aberdeen University in 1870. He graduated in 1874 with first-class classical honours, being awarded the Town Council gold medal as the most distinguished graduate of his year. He had an equally brilliant career in medicine at Edinburgh University, and, on his graduation in 1879 as M.B., C.M., with first-class honours, he obtained the Ettles Scholarship as the best student of his year. During his tenure of the Leckie-Mactear Fellowship he studied at Vienna, Heidelberg, Frankfurt, and Paris.

Returning to England, he commenced his professional career by being for a time assistant clinical clerk at the West Riding Asylum, Wakefield. In 1882 he took his M.D. degree, obtaining a gold medal for his thesis. Settling in Edinburgh, he gradually built up a large general practice. He became a lecturer on pathology at the Surgeons' Hall and pathologist to the Royal Infirmary, to the Royal Hospital for Sick Children, and to the Longmore Hospital for Incurables. He also lectured at the Surgeons' Hall on neurology, and later on the practice of medicine, while he was appointed a physician and lecturer on clinical medicine at the Royal Infirmary.

By this time he had acquired a considerable reputation as a consultant, especially in diseases of the nervous system. His contributions to the literature of this subject were very numerous, being marked especially by the care with which pathological lesions were investigated and described. The chief characteristic of his work was thoroughness, and in the preparation of these published reports of cases no labour, whether of bedside observation or of microscopic work, was spared. He did not restrict himself to neurological subjects, but published communications on general pathology and medicine. He also translated Thoma's "Lehrbuch der Pathologie."

It was characteristic of Dr. Bruce that he should undertake pioneer research into the minute anatomy of the brain and spinal cord. It is with this work that his name will perhaps be most associated. He began by publishing "Illustrations of the Mid and Hind Brain" and "Topographical Atlas of the Spinal Cord." Numerous researches on the nuclei of the cerebral and spinal nerves, on cranial nuclei, and on the nerve-fibre connections of these we owe to him. A notable example of this work is "Distribution of the Cells in the Intermedio-Lateral Tract of the Spinal Cord"

(Trans. Roy. Soc., Edin., 1906), a research which must form the basis of all subsequent work on this subject. Feeling the need of a "Centralblatt" in English which should contain short, original communications and provide abstracts and a complete bibliography of recent work on neurological subjects, he founded in 1903 *The Review of Neurology and Psychiatry*. To the interests of this work he devoted a large part of his time, with what success only those who work on neurological subjects can adequately appreciate. Just before his last illness he had finished a translation into English of Oppenheim's great "Lehrbuch der Nervenkrankheiten," while he was busily engaged, along with Dr. Dawson, in an investigation on the lymphatics of the spinal cord.

Dr. Bruce was a strenuous worker. It was only by systematic economy of his time that he was able to keep abreast of his multifarious duties. His influence over the younger workers with whom he was associated was great. Among his *confrères* he was held in highest respect, as well for his uprightness and generosity as for his ability. As a mark of his distinction in neurology he was in 1899 made a corresponding member of the Neurological Society of Paris. In 1906 the Royal Society of Edinburgh awarded him the Keith prize for his work on the intermedio-lateral tract, and in 1909 the University of Aberdeen conferred on him the degree of LL.D. He is survived by a widow, two daughters, and three sons, one of whom has already made important contributions to neurological science.

#### NOTES.

THE council of the London Mathematical Society has awarded the De Morgan medal for 1911 to Prof. H. Lamb, F.R.S., in recognition of his researches in mathematical physics.

THE British Empire League and the British Science Guild are combining to entertain the Colonial Prime Ministers and other distinguished visitors at a banquet at the Savoy Hotel to-morrow, June 16. His Grace the Duke of Devonshire (president of the British Empire League and vice-president of the British Science Guild) will take the chair.

THE annual meeting of the Association of Economic Biologists is to be held at the rooms of the Linnean Society, Burlington House, London, on July 6.

ACCORDING to the June number of *The Selborne Magazine*, the annual conversazione of the Selborne Society held in London on May 5 was the most successful of the whole series. It was announced that the original MS. of Gilbert White's *Nature Calendar* is to be published shortly.

MR. FRANK A. PERRET, of Springfield, Mass., is proceeding to Hawaii to open and take charge of the volcanic observatory which has been established there through the combined efforts of the Massachusetts Institute of Technology, the Smithsonian Institution, and the Carnegie Institution of Washington.

A PROPOSAL will be laid before the members of the Aeronautical Society to reconstitute the society by the institution of the following five grades of membership, viz. ordinary members, associate members, fellows, associate fellows, and students, the last three categories being reserved for persons engaged in technical work connected with aeronautics, while the first two are open to all who are interested in the work of the society.

THE death is reported, in his seventy-fourth year, of Dr. Cyrus G. Pringle, botanical collector to Harvard University and curator of the herbarium of the University of Vermont. His best known work was done in connection with the exploration of the flora of Old Mexico, about fifty of the most important herbaria in the world having benefited by his researches in that country. Before his Harvard appointment he was a collector for the American Museum of Natural History in New York.

THE vessel carrying the collection of wild animals presented to H.M. the King by South Africa arrived in the Thames on June 1. The collection, which was brought home in charge of two keepers sent out by the Zoological Society, is stated to include about 200 animals. These are now housed in buildings specially erected for their reception in the Zoological Gardens, Regent's Park, and are exhibited to the public as the King's South African collection. They were inspected by the King on June 4.

REPRESENTATIVES of the Hessian Government, of the town of Darmstadt, and of numerous chemical works joined with many others on June 1 in congratulations to Dr. Willy Merck, of E. Merck, Darmstadt, upon the celebration of the twenty-fifth anniversary of his entry into the firm as a partner. In the name of the Grand Duke of Hesse, the representative of the Hessian Government handed to Dr. Merck the grand medal for art and science conferred upon him in recognition of his services, not only in promoting the advance of chemical research work and in developing this branch of the country's industry, but also as a distinguished patron of art.

MR. HARVIE BROWN writes to us suggesting that the great Scots pine trees on Auchnacarry are probably of much greater age than the two hundred or three hundred years at which they were recently estimated in our columns (June 1, p. 447). Mr. Harvie Brown is very probably in the right. But we are informed by the timber merchants, Messrs. Souness and Spiers, Edinburgh, that they will be at work in the forest within the next two or three weeks, and that plenty of trees and logs will then be available for ascertaining the actual age.

A BILL has been introduced in the House of Representatives of the United States of America "to establish in the District of Columbia a laboratory for the study of the criminal, pauper, and defective classes." We understand from Mr. Arthur MacDonald, of Washington, who has been prominent in advocating the establishment of such laboratories, that the Russian Government has already set aside a large sum of money for this purpose. The fundamental problem in such studies, it seems to us, is to determine which individuals among the criminal, pauper, and feeble-minded population occupy that position through accidental misfortune, and which are congenitally defective. It is useless, or worse, to spend money in the hope of curing the latter class. Permanent care and control is for them the only hope, and for society the most feasible way of preventing the ever-growing burden of their criminal or incompetent descendants.

A VIOLENT earthquake occurred in Mexico on June 7 at 4.35 a.m., and gave rise to unusually large disturbances in distant seismographs. In Mexico city many poorly-built houses were destroyed, and 172 persons were killed. The shock or shocks lasted there for about six minutes. The total number of deaths is estimated at 1300, of which 500 occurred at Zapotlan. The volcanoes of Colima and Popocatepetl are also said to be in active eruption. The position of the origin is still unknown.

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An earthquake capable of affecting European seismographs so strongly must have caused widespread destruction in the central area, and it is possible that this area may be isolated from the surrounding country, so that the full extent of the disaster may not be realised, or, for political reasons, detailed telegrams may be censored. It is clear, however, that the epicentre was at some distance from those of the Mexican earthquakes of 1905 and 1907. In those years the towns which suffered most were Chilpancingo and Acapulco, which lie from 200 to 250 miles south of Mexico city. Zapotlan is about 275 miles west of that city, and is situated in a well-known seismic district, having on several occasions been damaged or destroyed by earthquakes.

FOR the use of the members of the sixteenth annual Congress of the South-Eastern Union of Scientific Societies, held at St. Albans last week, the Hertfordshire Natural History Society and Field Club has issued an excellent guide to the topography, natural history, archaeology, &c., of the city and the surrounding neighbourhood, the account forming part iii. of vol. xiv. of the society's Transactions. Mr. John Hopkinson has acted as editor, and has himself contributed the sections on topography, geology, hydrology, and climate, while the other sections have been written by various members of the society. The guide is illustrated by a map of the district, a plan of modern Verulamium, and several local views, and will be of permanent value to residents in and visitors to the neighbourhood. The congress lasted from June 7 to 10, and at the inaugural meeting a resolution was passed expressive of the hope that the negotiations between the Society of Antiquarians and the Earl of Verulam for the excavation of the site of Verulamium, which—owing in part to the death of King Edward—fell through last year, may be resumed and brought to a successful issue. Lieut.-Colonel D. Prain, F.R.S., was nominated president of next year's congress in succession to Sir David Gill, K.C.B., F.R.S.

THE Huxley lecture at the University of Birmingham was delivered this year, on May 29, by Prof. Henri Bergson. He chose "Life and Consciousness" as the subject of his lecture. He proposed the view that a world-wide antagonism exists between matter, which is essentially automatic and governed by necessity, and consciousness, which is characterised by the power of choice and creation. Consciousness, he believed, entered matter in order to entice it to organisation; but in thus binding itself to matter, consciousness lost much of its original liberty, and was continually being dogged and cramped by automatism. Prof. Bergson conceived consciousness as flowing through matter much as a stream of fluid flows through a tunnel; in digging galleries in this hard rock, consciousness found itself impeded at point after point. Thus it had repeatedly to make fresh starts in its ceaseless efforts to create, until finally, in the course of this crooked path of evolution, it created man. In man alone, the chains which elsewhere bound consciousness to matter were broken. Here, maintained the lecturer, every contracted habit could be opposed by another habit, every kind of automatism by another automatism. Consciousness thus acquired its liberty by setting one necessity to fight another. In this way it has expanded to such a state of freedom that in man, perhaps, it may be able to endure beyond his earthly life.

THE fine series of big-game and other sporting trophies arranged in a special building at the Festival of Empire and Imperial Exhibition at the Crystal Palace, and opened



to the public last week, is of interest from two points of view. It is, for instance, the first attempt to bring together in this country a collection of the big-game animals (exclusive of zebras, wild asses, and giraffes) to be found within the limits of the British Empire, while, in the second place, it includes many of the finest heads of animals of this nature which have fallen during the last thirty or forty years to the rifles of (mainly British) sportsmen. Although it was found impossible to render the series absolutely complete, the exhibition affords an excellent idea of the wonderful extent of the big-game fauna of Greater Britain, and how vastly it exceeds that of any other empire in the world. The specimens are arranged according to countries, and thereby afford an excellent object-lesson in geographical zoology, so far as it can be learnt from a few groups of mammals. Those who visit the Crystal Palace exhibit will at once realise how much is lost by the lack of a geographical section in the zoological department of the Natural History Museum. A considerable proportion of the specimens exhibited at the Crystal Palace were shown last year at Vienna, but, on the other hand, there are many new objects, a few of which are of more than ordinary interest. To particularise these on the present occasion is, however, out of the question, and we may conclude by offering congratulations to Lord Woiverton, the president, Mr. C. E. Fagan, the hon. organising secretary, and the other promoters of this extremely successful and instructive exhibition.

WE have received a booklet entitled "Vergiftungen durch Tiere und animalische Stoffe," by Dr. Kanngiesser (Jena: Gustav Fischer, 1911, price 1 mark), which gives a brief but simple and comprehensive survey of animal poisons, e.g. those of insects and arthropods, molluscs, fish and toads, snake venom, &c. Some of the subjects, however, being infections rather than intoxications, e.g. amoebic dysentery, coccidiosis, trypanosomiasis, and trichinosis, seem somewhat out of place.

IN a review on "Salvarsan" which appeared in NATURE of May 25 (p. 412), it was stated that Ehrlich had introduced trypan red for the treatment of piroplasmosis. Prof. Nuttall writes pointing out that this is an error; it was tried by Ehrlich for the treatment of trypanosomiasis. Trypan red was first used by Prof. Nuttall in conjunction with Dr. Hadwen for the treatment of canine piroplasmosis, but proved unsatisfactory, and trypan blue, a drug which emanated from Mesnil, has been used instead with considerable success in the treatment of piroplasmosis in different parts of the world.

NO. 42 of the Scientific Memoirs of the Government of India deals with the cultivation of the leprosy bacillus. The cultivation of this micro-organism has almost baffled investigators, only a few undoubted cultures having been obtained. Major Rost makes use of a culture medium prepared by steam distillation of rotten fish, and to this distillate some weak Lemco broth and milk are added. Inoculated with material from leprosy patients, masses of "acid-fast," leprosy-like bacilli develop in a few days. Captain Williams, using Major Rost's medium, or a somewhat similar one, in which distilled water replaced the fish distillate, has also obtained cultures of what he considers to be the leprosy organism. An interesting fact brought out by the work is the extreme variation of the leprosy organism; sometimes it has the ordinary bacillar form and is "acid-fast," at others it is non-acid-fast, while diphtheroid and streptothrix forms frequently appear, the streptothrix often breaking up into bacillar forms. Both

these observers have prepared vaccines with which promising results, as regards the cure of the disease, have been obtained.

IN the report of the Horniman Museum and Library for 1910 attention is directed to the gift, by Mr. A. R. Brown, of a number of specimens illustrative of the ethnology of the Andaman Islands. During the year, the museum has lost the services of Mr. F. Slade, whose appointment as naturalist considerably antedates the transference of the institution to the County Council.

IN an article in the May number of *The Museums Journal*, Dr. Bather directs attention to the palæontological exhibit at the "White City," the leading idea of which is to display the scientific results attained by the study of palæontology, and more especially such as can be obtained only by means of this science. The restoration of extinct animals constitutes one section of the exhibit; a second is devoted to extinct faunas and floras in connection with their bearing upon the present distribution of animal and plant life upon the surface of the globe; while a third section illustrates contemporary individual variation in a species. The last-named feature leads on to the evolution of species and genera, which is also exemplified by actual examples.

*The Scientific American* of May 11 contains an illustrated account on the so-called "dinosaur-mummy"—that is to say, a skeleton of *Trachodon* still covered with the skin obtained in 1908 by Mr. C. H. Sternberg from the Cretaceous of Wyoming. One of the illustrations shows the finely tuberculated, or granulated, structure of the external surface of the skin, while a second reproduces the latest restoration of the entire animal. The tenuity of the skin suggests aquatic habits on the part of these dinosaurs, and this view is strengthened by the circumstance that the relatively small fore-legs terminated in a broad expansion of the skin, converting the toes into a kind of paddle, and projecting beyond their tips. The expansion of the extremity of the muzzle into an edentulous, duck-like beak seems likewise indicative of aquatic habits.

TO *La Nature* of May 27 Dr. E. Trouessart contributes an account of a specimen of the New Guinea long-beaked Echidna (*Zaglossus*, or *Proechidna, bruynei*) now living in the Zoological Gardens at Amsterdam, which is probably the first example of its kind ever brought alive to Europe. It belongs to the race for which Mr. Rothschild proposed in 1892 the name *Z. b. nigro-aculeatus*. The communication is illustrated by two photographs, which show that the pose of the creature is quite different from the one given in pictures and mounted specimens. In these the animal is represented with the belly resting on the ground, and the claws of the hind-legs directed like those of a lizard. In reality, it stands up on its legs in elephant-fashion, with the hind-claws directed outwards and slightly forwards, this being a remarkable attitude for a burrowing animal. Unlike the ordinary echidna, which refuses to touch them, the long-beaked species exhibits a marked partiality to earth-worms.

A PALÆONTOLOGICAL communication by Mr. E. W. Berry, published in the Proceedings of the United States National Museum (No. 1821), presents a revision and reduction of species referable to fossil gymnospermous genera from the Potomac group. Of eight genera reviewed, *Sequoia* is represented at the present day, *Arthrotaxopsis* and *Cephalotaxopsis* indicate by their names their relationship to modern genera, *Brachyphyllum* and *Sphenolepis* are *sedes incertae*; the two latter genera are

possibly composite. Cones and seeds of a pine, *Pinus vernonensis*, are abundant in the group.

THE modification of plants induced by the extremely dry summer in West Australia furnishes the subject of a contribution by Dr. A. Morrison to the Journal of the Natural History and Science Society of Western Australia (vol. iii., No. 1). A thick development of woolly hairs on stem and leaves is shown by *Eragrostis eriopoda*; rolling back of the leaf margins is the device exhibited by *Grevillea oxy stigma*; *Plagianthus Helmsii* furnishes an instance of extreme specialisation in an arrangement of closely set minute leaves. *Daviesia euphorbioides* is an interesting case of a leguminous plant which has developed a succulent cactus-like form, while *Calandrinia primuliflora* is provided with a water-storing tubercle.

THE concluding portion of Dr. C. B. Robinson's article on Philippine Urticaceæ, published in *The Philippine Journal of Science* (Botany, vol. vi., No. 1), contains the diagnosis and illustration of a new generic type, *Astrothalamus*, segregated from *Maoutia*, and several new species, notably under the genus *Leucosyke*. In the same number Mr. O. Ames presents a list of new records and species of Orchidaceæ, with an introductory note summarising his conclusions regarding the orchid flora of the Philippines. *Dendrochilum*, *Dendrobium*, and *Eria* stand out as the most important genera. No genus is entirely confined to the islands, but the numerous species contained in one section of *Dendrochilum* are all endemic.

THE current number of *The Gardener's Chronicle* (June 10) contains the first part of an article by Mr. H. N. Ridley, describing a botanical expedition to Lower Siam, undertaken with the object of demarcating the boundary between the two distinct floras of Malaya and Tenasserim. On the island of Alostar the northern element was already recognisable in the shape of a common species of *Corypha* palm and a yellow vetch, a species of *Geissaspis*, growing as a weed in the rice fields. *Crinum Northianum* and a *Lepanthus* were notable discoveries, as also the growth of *Leea rubra* in the mud flats. Attention is also directed to a contribution by Mr. R. Farrer, presenting a systematic synopsis of European species of *Primula*, with the object of clearing up some of the confusion which exists owing to changes in nomenclature.

VARIOUS problems, mainly economic, are discussed by Mr. A. D. Blascheck in an article contributed to *Science Progress* (April) on the subject of afforestation in the United Kingdom. He proceeds to show that the climate is suitable, that land is available, and that Great Britain has a smaller proportion of land under forest than any other European country. But the crux of the situation lies in the financial aspect, with reference to which the opinion is expressed that forests, as a rule, yield less profit than Government securities, so that the benefits derivable are indirect, chiefly in the extra employment of workers required for the timber and allied industries. These arguments lead to the recommendation of measures that were proposed in the Development and Roads Improvement Funds Act, 1909, i.e. "the conducting of inquiries and research for the purpose of promoting forestry and the teaching of methods of afforestation," as also "for the purchase and planting of land found after inquiry to be suitable for afforestation."

MR. F. MUIR has recently published an account, in Bulletin No. 9 of the Experiment Station of the Hawaiian Sugar Planters' Association, of some new species of leaf-hopper (*Perkinsiella*) on the sugar-cane. The genus was investigated by Kirkaldy in 1903; it is particularly

attached to the sugar-cane, and only occasionally goes on to other grasses. At present there are thirteen known species.

MR. L. D. LARSEN has recently collected his work on the diseases of the pineapple, and published it as Bulletin No. X. of the Hawaiian Sugar Planters' Association. The fungus *Thielaviopsis paradoxa* is by much the most destructive micro-organism involved, causing three distinct and important diseases, in addition to being responsible for a good deal of the decay in pineapple roots. It is in general saprophytic, but in certain conditions it becomes parasitic. A disease known as brown rot was traced to *Fusarium*. The fungus causing the very serious pineapple wilt is not yet isolated with certainty.

THE fifth annual report of the work at Rosslynlee, by Messrs. Lauder and Fagan, on the variation in composition of cow's milk, shows what a small effect ventilation of the cowshed has on the yield of milk. The shed was divided by a wood and felt partition into two parts, one of which was freely ventilated, even in the coldest weather; the other was only partially ventilated, so that its average temperature was higher by about 9° F. In the cool, well-ventilated part the average yield per cow per day was 27.54 lb., and in the warm, badly ventilated part it was 27.14 lb., the percentages of fat being respectively 3.74 and 3.70.

MESSRS. SCHREINER AND SKINNER have published, in Bulletin No. 75 of the United States Bureau of Soils, an account of the soils most suitable for lawns in the United States, and of the detailed cultivation and manuring necessary to obtain a good growth of grass. Some of their recommendations, however, seem quite inconsistent with the official views of the Soil Bureau; thus their advice to use phosphatic manures seems intelligible only on the old view that phosphates are needed to feed the young plant. It is significant that gardening has become of sufficient importance in American life for a great State department to undertake such an investigation as the present one.

AN article by Dr. H. v. Ficker on the interesting subject of the advance of cold waves in Asia and Europe appears in the Proceedings of the Vienna Academy of Sciences for December last. The data upon which it depends are drawn chiefly from the Russian Meteorological Annals for 1898-1902. About fifty cold waves were investigated, and nearly 200 charts drawn, in this laborious work; a few typical cases only, with charts, are included in the article, with a short discussion of the majority of the other periods. The greater frequency of cold waves in winter would lead one to suppose that they proceeded from the cold centre in north-east Siberia, but this view has not been confirmed. In the majority of cases they were found to come from the Arctic coast, between long. 30° and 90° E. Distinction is drawn between those proceeding from the west of Novaia Zemlia, accompanied with north-west winds, and those proceeding from the east of that island, accompanied by north-east winds. The spread of the cold air is found to take place earlier towards Europe than towards Siberia. The maximum velocity of the waves is about twenty-five miles an hour, and thus corresponds fairly well to the rate of propagation of thunderstorms. Their irruption causes a sharp rise of the barometer; they are preceded by low pressure, and generally with a rise of temperature.

THE classification of the visible forms of the various sextic plane curves forms the subject of a paper by M. W. Sierpinski in the *Bulletin international* of the Cracow Academy, No. 10 A (1910).

THE Proceedings of the Royal Society of Edinburgh, xxxi., 3, contains three papers by Dr. T. Muir, F.R.S., dealing with the historical development of certain determinants up to 1860. The papers refer respectively to "Wronskians," "Recurrent Determinants," and "The less common special Forms."

IN two notes contributed to the *Atti dei Lincei*, xx., 5, 7, Dr. U. Cisotti works out *in extenso* the solution of the problem of discontinuous stream-line motion of a jet which is divided in two by impact on a fixed plane, the jet being of finite breadth and bounded by free stream lines.

IT is announced that after the close of the present volume the *Annals of Mathematics*, hitherto published in October, January, April, and July, under the auspices of Harvard University, will be transferred to Princeton University, New Jersey, to which address editorial and other communications are in future to be sent.

IN the Bulletin of the American Mathematical Society for May Prof. Florian Cajori publishes a paper in which it is claimed that the now familiar "Horner's method" of solving an algebraic equation had been previously given by Paolo Ruffini in an Italian paper. The methods adopted by Ruffini and Horner seem to have been identical to a very great extent; the main differences which Cajori mentions are that Horner explained a special procedure for separating a pair of nearly equal roots, and, further, that he contemplated the application of his method to transcendental equations. It need hardly be pointed out that the solutions of such equations as  $\tan x = x$ , which can be expanded by Taylor's theorem, constitute some of the most useful and well-known applications of Horner's method.

WE have received a copy of Mr. W. J. Lyons's paper read before the Royal Dublin Society recently on a method of exact determination of the continuous change in absolute density of a substance in passing through its fusion stage. The apparatus consists of a dilatometer bulb, from the lower end of which a capillary issues, and is bent first upwards and then horizontally. This tube and the lower part of the bulb are filled with mercury. The upper part of the bulb contains the substance the expansion of which is to be determined, and the magnitude of the expansion is calculated from the motion of the mercury meniscus in the capillary tube. Experiments on wax show that the fusion lasts over a considerable range of temperature, and that in the neighbourhood the volume on cooling is, at the same temperature, greater than on heating. As the apparatus only differs from Pettersson's of 1881 in the absence of taps for the admission of the substance, it is to be regretted that Pettersson's name is not mentioned in the paper.

THE address given by Prof. Planck to the Société française de Physique on April 21, and reproduced in the May number of the *Journal de Physique*, constitutes one of the clearest expositions we have seen for some time of the present difficulties of the attempt to express the relation between energy and temperature. The doctrine of the equipartition of energy amongst the various degrees of freedom of a molecule, deduced by Boltzmann and Gibbs, has led to serious difficulties owing to the smallness of observed specific heats as compared with the calculated values. Planck's own theory, that energy exists in multiples of a certain atomic quantity, leads to difficulties with regard to absorption of energy, and, as we pointed out in these columns on March 16 (p. 90), he has now modified it so that only emission takes place by the step

by step process, absorption being continuous and energy content of a body no longer an integral multiple of the atomic energy. Whether this change gives us a satisfactory theory only time can show.

*The Builder* for June 9 contains an illustrated article, by Mr. Percy J. WalDRAM, on the need for horizontal tie-rods in arched timber roofs. Generally, the introduction of such rods is owing to the designer assuming that the joints are flexible, and constructing a force-diagram based on this assumption. Actually, the stiffness of the joints as constructed in practice renders the fitting of tie-rods quite unnecessary in a properly designed arched roof. The author cites the case of the fine arched hammer-beam roof of Eltham Parish Hall, which has no tie-bars, and gives account of an interesting experiment carried out on one truss, which was mounted on pipe rollers on the ground and loaded with bricks laid on a platform slung from the truss. With a span of 42 feet and a load of 7 tons the calculated outward spread was 0.63 inch. Upon the first application of the load, the spread was found to be slightly more than 1 inch, owing partly to the tightening up of the joints. On removing the load, the truss came back 0.75 inch, and in each of the two reimpositions of the load, at intervals of two days, the spread was found to be 0.75 inch. The object of the test was attained, inasmuch as the district surveyor withdrew his requisition for tie-rods.

THE report of the Indian Association for the Cultivation of Science for the year 1909 has now been received. The association's chief work seems to be the arrangement of lectures on scientific subjects. During the year about 280 lectures on various branches of physics and chemistry were delivered, and in addition upwards of a hundred practical demonstrations were arranged. The chemical laboratory conducted by the association has been remodelled, and it is hoped soon to inaugurate a research department. The report also contains a set of meteorological observations taken at Calcutta during 1909.

IN a review of Prof. Leduc's book on biological aspects of osmotic phenomena in *NATURE* of May 25 (p. 410) the writer gave examples of the need of proof-reading, and stated that there were errors in the title of a book by Rhumbler. He inferred, unfortunately without verification, that the strange words "organismischer" and "anorganismischer" were typographical errors, but Prof. Leduc writes to point out that they are the words Rhumbler used in his title. The reviewer regrets that he was guilty of the kind of carelessness for which he reproached Prof. Leduc, but he is afraid that his remark as to misprints remains true.

#### OUR ASTRONOMICAL COLUMN.

A REMARKABLE METEORIC PHENOMENON.—In No. 4503 of the *Astronomische Nachrichten* Dr. Max Wolf describes a curious phenomenon observed on May 22, at about 11h. 49m. (Königstuhl M.T.), at Heidelberg. A faint meteor, pursuing a  $4^\circ$  path obliquely from east to west, passed over the star  $\gamma$  Aquilæ with great velocity; its breadth was about  $15'$ , and it left a faint trail, which disappeared immediately. But although this trail was only momentarily visible, the star remained invisible for at least 3.5 seconds, its light apparently cut off by the material left behind by the evanescent meteor.

THE DIFFERENT QUALITY OF THE LIGHT REFLECTED FROM DIFFERENT PARTS OF THE MOON'S SURFACE.—The results obtained by Herren A. Miethe and B. Seeger in photographing the moon's surface through colour-selective screens are further described in No. 4502 of the *Astronomische Nachrichten*, and illustrated by a two-colour